

Simulations in undergraduate nursing programmes in New Zealand: current status and next steps

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Accepted 3 July 2016
Published Online First
20 July 2016

ABSTRACT

Introduction There is an increasing global tendency to use simulations in nursing education. This research examined the current status of simulation programs in undergraduate nursing schools in New Zealand. The goal was to gain a better understanding of how simulations are currently implemented in nursing schools and to identify the associated opportunities and challenges.

Methods 16 nursing schools in New Zealand deliver undergraduate nursing education. 10 of these schools selected a nursing leader who was involved in the schools' simulation program to complete an online survey. The survey questions were designed to explore the nature of simulations in nursing schools, and the opportunities and challenges experienced in the implementation of these programmes.

Data analysis Survey data were analysed and presented as summary statistics (frequencies and percentages). Responses to short questions were thematically analysed and common themes were identified. The analysis was divided into demographic characteristics and main results.

Results The key outcomes of the study have shown the prevalence of various simulation modalities in nursing schools in New Zealand. The analysis also suggests that the current practices associated with the integration of simulations into nursing education in New Zealand are fragmented and sporadic. Challenges shared across all institutions include inadequate resourcing of simulation programs, poor curriculum integration and programme alignment; a lack of shared understanding of what constitutes simulation and the extent to which simulation modalities achieve learning outcomes.

Conclusions The outcome of this study has contributed to a better understanding of the prevalence and nature of simulation programs in undergraduate nursing schools in New Zealand. It has also provided insights into the different opportunities and challenges associated with implementing these programmes in nursing schools. Furthermore, the research has identified important conceptual and theoretical issues related to the broad discourse on the use of simulations in undergraduate nursing education.

INTRODUCTION

Clinical placements are a crucial component of undergraduate nursing education because students experience a range of opportunities to apply classroom knowledge to patient care. More specifically, clinical placements offer students situated and rich learning experiences.¹ However, students' experiences vary widely during clinical placement. Studies show that factors such as the student—preceptor relationship, time pressures and the spontaneous occurrence of clinical presentations influence learning

opportunities.^{2,3} Additionally, the evolving healthcare system, high patient acuity and the increased use of technologies conspire to create an increasingly demanding and unpredictable healthcare environment where adequate access to placements for clinical learning has increasingly become a challenge for many nursing schools.^{1,3–5}

In New Zealand, current literature suggests that like their international counterparts, nursing schools are struggling to access enough clinical placements for student learning.^{3,4,6} In 2014, the National Nursing Organisation (NNO) acknowledged that finding quality clinical learning opportunities is becoming problematic. One recommendation was that alternative models of clinical education be developed and resourced to meet future health workforce needs.³ In response, the Nurse Educators in the Tertiary Sector (NETS) proposed investigating the possibility of substituting a proportion of clinical hours with clinical simulations.³ Currently, the New Zealand Nursing Council does not permit simulation hours to be counted towards the minimum 1100 clinical hours required in the undergraduate nursing degree.⁷

BACKGROUND

Simulations in nursing education

Nursing educators have used various forms of simulation for many years, beginning with anatomical models and task trainers through to role playing and gaming.⁸ In recent years, educators have seized the opportunities afforded by advances in simulation technologies to move beyond using simulations for psychomotor skill acquisition, to replicating clinical scenarios through realistic simulators and environments to teach affective and cognitive skills.^{9,10} Today, simulations are commonly used to develop students' skills in teamwork, therapeutic communication and clinical judgement.^{5,10}

In undergraduate nursing education, the use of clinical simulations is growing. However, the conception of what constitutes simulations remains a challenge for researchers. The difficulties with conception are likely due to the different simulation modalities and varying purposes for its use. Furthermore, in the literature, simulation terminology is inconsistent and the concepts associated with teaching and learning in these environments are unclear.^{11,12} For example, Poikela & Teras¹² identified 13 conceptualisations and 5 pedagogical models linked to simulations. These authors concluded that the construct of simulation was multifaceted and intricate with a broad array of applications and understandings. Recently, the International Nursing Association for Clinical Simulation and Learning (INACSL) offered clarity



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To cite: Lesa R, Daniel B. *BMJ Stel* 2016;2:118–123.

and consistency around terminology and concepts for research purposes.¹³ The conceptualisation of simulation for this study uses the INACSL definition of a simulation-based learning experience. 'An array of structured activities that represent actual or potential situations in education and practice and allow participants to develop or enhance knowledge, skills, and attitudes or analyse and respond to realistic situations in a simulated environment or through an unfolding case study' (ref. 13; p. 9).

Establishing simulation programs

There is growing evidence suggesting that simulations are useful for teaching higher cognitive skills to students.⁵ A notable simulation study in nursing education is a large-scale randomised trial in the USA that sought to determine whether substituting a proportion of students clinical hours, with simulations, had an impact on the educational outcomes.⁵ The findings have shown that high-quality simulations could substitute up to 50% of a student's clinical hours without compromising the educational outcomes. These results raised concerns that the utility of these findings may tempt nursing programmes to substitute a proportion of clinical hours with simulations without the appropriate staff preparation, environment or support in place.¹⁴ In response, an expert panel convened by the USA National Council of State Boards of Nursing (NCSBN) developed six guidelines for simulation in undergraduate nursing programmes.¹⁴ The purpose of the guidelines is to help governing bodies determine if nursing schools have the necessary support in place to substitute a proportion of clinical hours with quality simulations. Included in the guidelines are that the nursing school must be committed to the programme and provide appropriate facilities, resources and equipment to meet the learning objectives of simulation. Additionally, the nursing school needs to have qualified teachers and laboratory staff facilitating the learning experience and all staff involved in simulations should understand the policies and processes in place.¹⁴ These guidelines are especially useful for governing bodies in New Zealand who are currently considering alternative models of clinical education.³

Simulations in nursing education in New Zealand

Establishing simulation programs in New Zealand is rapidly gaining momentum as evident by projects seeking to progress the science of simulation nationally. For example, in 2010, the Council of Deans of Nursing and Midwifery (CDNM)—Australia and New Zealand—established an expert reference group to pool expertise and plan ways to share simulation knowledge.¹⁵ In 2013, Edgecombe *et al*¹⁶ published a literature review and guidelines for simulation practice in nursing education. In 2015, to improve communication and teamwork in operating theatres, Auckland University facilitated multidisciplinary simulations and reported that participant feedback was overwhelmingly positive.¹⁷ Furthermore, a project is currently underway by NETS to develop standardised and validated scenarios for clinical learning.¹⁸

In 2011, Health Workforce New Zealand endeavoured to establish a national skills and simulation-based strategy, aligned to four regional training hubs.¹⁹ The purpose of the training hubs was to share best practice and improve the learning experiences of trainees in nursing, medical and allied health. At the time of writing, this intuitive concept has not yet been fully implemented. The reason for the delay in establishing these goals is unclear, although a review of the literature highlights there are several challenges associated with implementing

quality simulation programs. The key challenges reported include inadequate resourcing, the logistics around timetabling a large number of students through simulations and supporting educators to learn how to use the technologies effectively.^{20–22} Furthermore, some authors identified there may be a degree of political pressure to embrace simulations, regardless of their relevance to desirable learning outcomes or data to support effectiveness.^{21 23}

Given the recent guidelines for simulation implementation put forward by the NCSBN¹⁴ and the recommendations from the NNO³ that educators explore alternative models of clinical education, there is an urgent need for exploratory research to understand the current status of simulation programs in New Zealand nursing schools. This urgency is particularly important in light of an anecdotal observation by an academic that in New Zealand, simulation practices seem to develop in an ad hoc way and that compared with the rest of the world, nursing schools are behind in uptake and application of simulation.⁶

This research was undertaken to gain a better understanding of how nursing schools currently implement simulations and identify opportunities and challenges associated with teaching and learning in these environments. The research question for this study was twofold: How do undergraduate nursing schools in New Zealand currently implement and sustain simulation and what are the associated challenges and opportunities?

METHODS

A cross-sectional surveyⁱ was used to gain an understanding of the nature of simulation in undergraduate nursing education in New Zealand. A survey was a suitable method for collection of data because it sets out to describe and interpret a situation at a given time.²⁴ The authors designed the online survey following a review of the simulation literature. The survey consisted of 39 questions with multiple-choice options and short answer questions in four sections. The first and second sections collected demographic data and asked questions to gain an overview of the school's simulation program. The other two sections asked specific questions about the school's use of simulation-based learning experiences and asked participants to describe the opportunities and challenges associated with simulation implementation. The survey was piloted with two nursing educators and a technician from the simulation program in the local nursing school to establish content clarity. The wording of simulation terminology was clarified after these surveys were returned.

Participants

At the time of this research, 16 higher education institutions in New Zealand delivered undergraduate nursing education leading to a Bachelor of Nursing; 3 within a university and 13 in polytechnics.⁷ Another nursing school has since been established. Recruitment strategy involved identification of the head of school or programme manager, through the institutions' website and sending them an invitation to participate in the research with a link to the online survey. Schools received the email in November 2014 and a reminder email in February 2015. The identified nursing school leader was asked to select the most appropriate person to complete the survey. Ten nursing schools selected a participant to complete the online survey, an equivalent response rate of 62%.

ⁱA copy of the survey can be obtained by emailing RL.

Data analysis

Data analysis involved both quantitative and qualitative data summarisation. Quantitative data were analysed with descriptive statistics using the Statistical Package for the Social Sciences (SPSS) V.21. Responses to short answer questions were systematically analysed; condensing raw textual data into key themes and themes were grouped into opportunities and challenges.²⁵ Departmental ethics approval was obtained from the affiliated university before data collection started.

RESULTS

Demographics

The majority of the participants who completed the survey were from nursing schools in the North Island (n=7, 70%). Other participants' were from schools in the South Island (n=3, 30%). Nine respondents were from polytechnics and the other participant was from a university. In addition to delivering registered nurse education, the schools in this study also provided enrolled nursing (n=5, 50%), return to nursing (n=7, 70%) and post-graduate programmes (n=6, 60%). The number of nursing students in the undergraduate nursing programmes ranged from 100 to 200 (n=3, 30%), 300 to 400 (n=5, 50%) and over 400 students (n=2, 20%). Most of the participants who completed the survey had between 1 and 2 years' teaching experience in simulations. One participant had less than a year's experience. The option 'other' was included in the survey but participants were not asked to specify what other meant. Table 1 presents the roles, responsibilities and the amount of education the participants had received in simulation.

Overview of simulation programs in New Zealand nursing schools

Participants were asked to indicate the modalities of simulations their nursing school used and the types of simulators owned. Questions were also asked about the positions, roles and training of the staff involved in the simulation program. In addition, information about guiding policies and associated frameworks was sought. To assist the participants complete the survey, they received the definitions presented in box 1.

Simulation modalities

As would be expected, partial task trainers were available in all 10 schools for teaching clinical skills. Nine schools use standardised patients, mostly through the use of role plays while six schools use peer-to-peer learning. Only four schools use screen-based or virtual reality simulation. No school currently uses haptic systems. Only one school reported using full-scale simulations despite eight schools owning one or more high-fidelity

Box 1 Definitions used for survey

- ▶ *Partial task trainers (low-tech simulators)*: Models or manikins used to learn, practice and gain competency in simple techniques and procedures
- ▶ *Peer-to-peer learning*: Peer collaboration used to develop and master specific skills
- ▶ *Screen-based computer simulations*: Computer programs used to (1) acquire knowledge, (2) assess competency of knowledge attainment and (3) provide feedback related to clinical knowledge and critical-thinking skills
- ▶ *Virtual reality*: Combines a computer-generated environment with tactile, auditory and visual sensory stimuli provided through sophisticated partial trainers to promote increased authenticity
- ▶ *Haptic systems*: A simulator that combines real-world and virtual reality exercises into the environments
- ▶ *Standardised patients*: Uses case studies and role playing in the simulated learning experience; individuals, volunteers or paid actors are taught to portray patients in a realistic and consistent manner
- ▶ *Full-scale simulation (medium to high fidelity)*: Simulation that incorporates a computerised full-body manikin that can be programmed to provide realistic physiological responses to a practitioner's actions; these simulations require a realistic environment and use of actual medical equipment and supplies
- ▶ *Reference*: Decker *et al.* (ref. 26; p. 75).

simulators. One school used another form of simulation but did not specify the modality. However, hybrid modalities were inadvertently omitted in the questionnaire and in hindsight, it would have been beneficial to include this modality.

Schools were also asked to indicate how many high and medium-fidelity simulators they owned. The survey defined a high-fidelity simulator as a 'sophisticated computerised manikin that mimics realistic physiological functions' and a medium-fidelity simulator as 'a manikin that looks real with some physiological functions such as heart and breath sounds but the chest does not rise and fall'. The number of medium-fidelity simulators in the nursing schools varied from 1 (n=3, 30%) to 3 (n=5, 50%). Two schools owned another type but did not clarify. The number of high-fidelity simulators in the nursing schools included 1 (n=5, 50%), 2 (n=2, 20%), 3 (n=1, 10%). One nursing school does not own a high-fidelity simulator and another school owned another type, again not specified.

Positions, roles and training of staff involved in the schools simulation program

The majority of schools did not have internal expertise and support mechanisms for simulation programs. Instead, most of the schools used companies that manufacture simulators and medical-training products to upskill their staff. The type of assistance these companies provided included technical support, scenario building and access to online resources and conferences. Participants also had access to the resources and events provided by simulation societies, nationally and internationally. One school implemented an internal simulation research hub to provide academics with opportunities to increase scholarship and research in simulation. Another participant replied that as simulation leader, it was their responsibility to provide ongoing

Table 1 Characteristics of the participants

Responses from the participants (N=10) N (%)

Roles		Responsibilities		Education in simulation learning	
Head of school	2 (20)	Management	3 (30)	<2 days	3 (30)
Simulation leader	3 (30)	Teaching	3 (30)	Around 1 week	3 (30)
Academic leader	2 (20)	Curriculum development	1 (10)	>1 week	3 (30)
Other	3 (30)	Other responsibilities	4 (40)	Other	1 (10)

teaching and tutorials for new lecturers. Nine of the 10 nursing schools used a simulation technician; four positions were in a part-time capacity only. One school shared the technician role with the local healthcare facility. The respondent from the nursing school who does not currently employ a technician believed it was necessary, but finances did not permit this. Seven of the 10 schools have appointed someone to lead the simulation program. However, four of these respondents replied that the leadership role was only a part-time position.

Guiding policies and frameworks associated with the simulation program

In response to questions around guiding policies and frameworks, various answers were received. One respondent uses an authentic work-based learning model and another school uses Tanner's (2006) Clinical Judgement Model.²⁷ One school adopted the NLN/Jeffries simulation framework,¹⁰ the National League of Nursing (NLN) scenario design template,¹⁰ and the standards provided by the International Nursing Association for Clinical Simulation and Learning.¹³ Other sources were curriculum documents to guide simulation and interested academic staff with the knowledge and skills, to guide learning. Table 2 presents an overview of the staff resources in each nursing school.

Simulation-based learning experiences

The third section of the questionnaire was designed to understand the specific practices associated with the use of simulation-based learning experiences which we defined earlier in this paper. The results have shown that the majority of these learning experiences occur in the undergraduate medical/surgical courses. Table 3 shows the programs and courses that use simulation-based learning experiences.

All schools who participated in the study required students to prepare for the simulation-based learning experience. However, preparation varied. Some schools provided students with a description of the scenario/simulation, learning objectives and asked them to revise the relevant protocols of engagement. Other schools required students to complete pre-readings, online resources and revise coursework.

The findings have shown that the nursing schools allocate a range of roles in simulation-based learning experience. Not surprisingly, all schools assigned a student nurse role. Ninety per cent of schools use a peer observer role, mostly because this enabled a greater number of students to participate by providing peer feedback and contributing to the debriefing session. One school did not ask students to play the registered nurse (RN) until they were closer to graduation because the role might be greater than a beginning student could comprehend. Table 4 presents the roles assigned to students in simulation-based learning experiences.

Table 2 Staff resources in the simulation program

Responses from participants	(N=10) N (%)
Dedicated simulation room	10 (100)
Education for staff	10 (100)
Simulation technician	9 (90)
Simulation leader	7 (70)
Guiding simulation model	7 (70)
Simulation team	4 (40)

Table 3 Where simulation-based learning experiences are used

Responses from the participants	(N=10) N (%)
In the undergraduate nursing programme	
Medical/ surgical course	9 (90)
Primary/community health course	7 (70)
Theory courses	5 (50)
Mental health courses	3 (30)
In other nursing programmes	
Competency assessment programmes (re-entry to practice programme)	5 (50)
Enrolled nursing	2 (20)
Postgraduate	2 (20)
Other	1 (10)

Table 4 Roles used in simulation-based learning experiences

Responses from participants	(N=10) N (%)
Student nurse	10 (100)
Peer observer	9 (90)
Registered nurse (RN)	7 (70)
Relative	7 (70)
Patient	6 (60)
Nurse (not specified if RN or student)	3 (30)

Five of 10 schools used video playback as part of the debriefing sessions. One school used a stop-start approach during video playback, in conjunction with Tanner's clinical judgement model,²⁷ to help facilitators cultivate students' critical thinking. Another participant described the opportunity to view the simulation afterwards as 'gold' because it facilitated peer discussions and helped generate critical thinking among students. One school moved away from recording and playback because the students did not like viewing themselves on screen. Some schools did not use video playback because they did not have the required equipment.

Two nursing schools provide interdisciplinary simulations. One of these schools is experimenting with paramedics' interaction with nurses and the other school is engaged in monthly interdisciplinary simulations with trainee interns and nursing students. For the majority of schools, limited engagement with interdisciplinary simulations was mainly due to lack of access to teams, the complexity of timetabling and resource limitations.

Opportunities and challenges

Participants identified that the inclusion of simulation-based learning experiences into the nursing curriculum offers many opportunities. For example, they viewed simulations as an effective teaching strategy to promote student-centred learning in a safe environment. Some participants believed that expanding simulation programs offers the opportunity to build on the strengths of educators, increase resources and deliver multidisciplinary learning scenarios. One respondent saw the potential to expand the school's simulation program by using hybrid modalities. This school is currently experimenting with an approach that enables the educator to hide behind realistic silicone masks and body parts.²⁸ The respondent said it was less time-intensive to set up, required fewer staff and increased students' access to simulation-based learning experiences.

Another participant believed there could be possibilities in the future to substitute a proportion of clinical hours with simulations. This respondent also noted that the work currently being undertaken by NETS to develop specific standardised simulation scenarios is an example of an opportunity simulation offers. Another participant suggested that simulations could be used to support and assess RNs who are undertaking a competence assessment programme to meet practising certificate requirements, set by the Nursing Council of New Zealand.

Participants also identified some key challenges. All schools lack adequate resources and time allocation for upskilling. Several participants said that to offer more simulations, more hours are required than currently allocated. Participants also reported issues with equipment failure, lack of staff expertise and limited technical support. Other challenges included time-tabling simulations, integrating simulation into current courses and helping students to engage and immerse themselves in the learning experience. One nursing school does not make simulations compulsory and the respondent believed this was not ideal because the students who would probably benefit the most from the extra learning may not attend. Another respondent questioned how the future may look if simulated hours are permitted to substitute a proportion of clinical hours.

DISCUSSION

Simulations are emerging as an alternative learning environment in undergraduate nursing education. An important reason for this is that simulations extend and support students' development of practical skills and knowledge that are traditionally acquired in clinical placements. However, the availability of a wide range of simulation modalities raises questions about the levels of fidelity and its relationship to authenticity and learning outcomes.^{11 12 29–31} These questions are evident in the results from this study in that one nursing school has moved to using a hybrid modality to increase realism and another school deemed the cost of owning a high-fidelity manikin unnecessary to meet the learning outcomes. This school's decision is not surprising considering the findings reported in the literature that medium-fidelity simulations offer the same results on knowledge acquisition, student satisfaction and clinical reasoning at one-fifth the cost of high-fidelity simulations.³² Clearly, regardless of the simulation modality or the level of fidelity this offers, achieving learning outcomes is dependent on the pedagogy deployed. Therefore, it is imperative that nursing schools in New Zealand determine intended learning outcomes, and overall return on investment before capitalising too significantly in the setting up and maintenance of simulation programs.^{33 34}

The results from the NCSBN Simulation Study⁵ that up to 50% of clinical hours can be substituted with simulations and still achieve educational outcomes is encouraging. However, questions about simulation modalities and the influence of these on learning outcomes remain unanswered. Selzer and Dunnington³⁵ suggest it is time to shift conversations from the efficacy of simulations to how best can we use simulations and what resources should be purchased to meet learning outcomes. Answering these questions is the first step towards addressing the systemic barriers associated with the integration of simulations into undergraduate nursing programmes in New Zealand.

STUDY LIMITATIONS

Limitations of this study include differences in participants' interpretation of the simulation terminology to what the researchers intended or supplied. As only one participant from the nursing school was asked to respond, the response may be

limited to their perspective. Furthermore, six schools did not participate and this input could have added valuable insights into the survey findings. The methodology used in the study is inadequately generalisable and does not provide any grounds for making causal inference. Since this is a snapshot study and simulation is maturing rapidly, outcomes might differ in the future.

CONCLUSION

Findings from this study have shown the prevalence of varying simulation modalities in New Zealand nursing schools. The analysis suggests that there are diverse pedagogical practices associated with the integration of simulations into the nursing curriculum. Although participants identified several opportunities, the key challenges related to the implementation and sustenance of these programs were shared across all institutions. For example, poor curriculum integration and programme alignment, a lack of shared understanding of what constitutes simulation and the extent to which simulation modalities achieve learning outcomes. It seems that while there is a progressive ownership of different simulation modalities across participating institutions, the level of technical support and resourcing these learning environments is unsystematic.

Although this study has only provided a general snapshot surveillance into the status of simulations programs in New Zealand nursing schools, it has set the stage for a national dialogue about the role of simulations in undergraduate nursing curriculums. Results presented may also be of interest to nursing schools worldwide that are considering establishing simulation programs. Given the infancy of simulations in undergraduate nursing programs in New Zealand, the authors recommend further research to determine the influence of simulation-based learning experiences on learning outcomes and the role of facilitators and students in creating a supportive and engaging learning environment. Furthermore, developing national policies and standards to enrich simulations as a learning environment and supporting the development of clinical skills and knowledge is required.

Contributors RL and BD have equally contributed to the conception and design of the work including the acquisition, analysis and interpretation of data and the drafting and revision of the work. RL and BD have approved the final version to be submitted and published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Funding Funding for this study in the form of a financial grant was received from the New Zealand Nursing Education and Research Foundation (NERF).

Competing interests None declared.

Ethics approval University of Otago Ethics.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement No additional data are available.

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